

Baltic InteGrid
on the WindEnergy Hamburg 2018



26. September 2018

Iberdrola in the Baltic Sea

Content

1. Iberdrola – An international energy leader
2. Wikingen offshore windfarm
3. Iberdrola's future projects in Baltic Sea
4. Grid connection concepts

1

Iberdrola

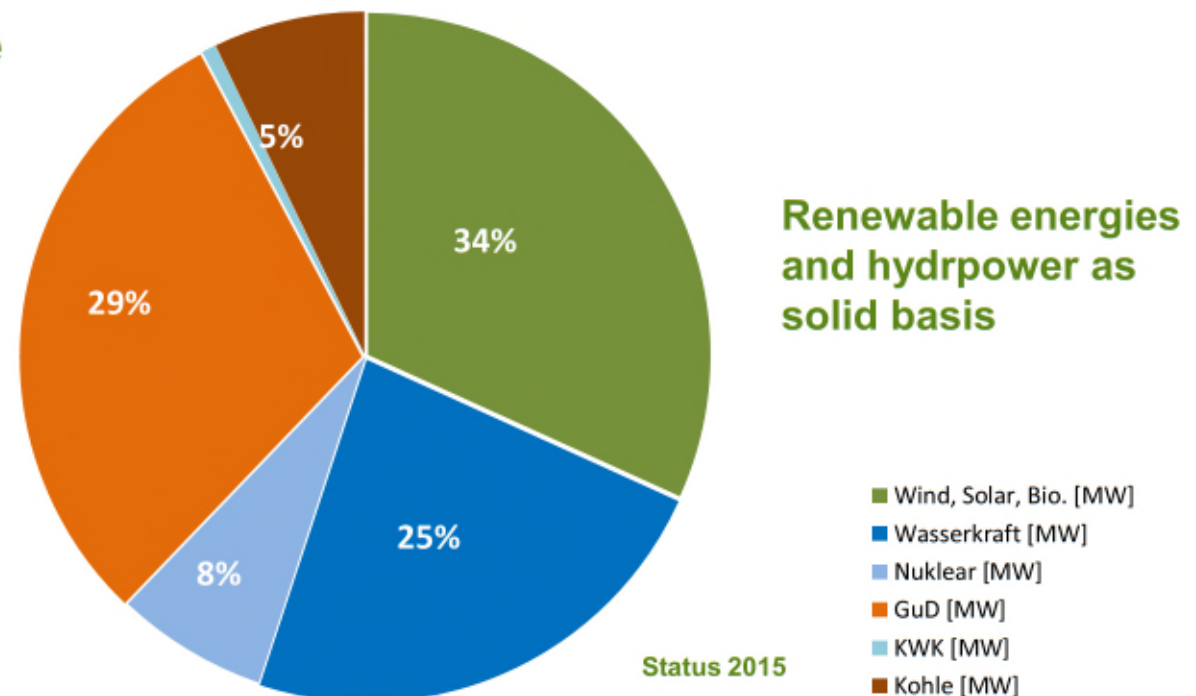
**An international energy
leader**

Focus – Renewable Energy and Grid

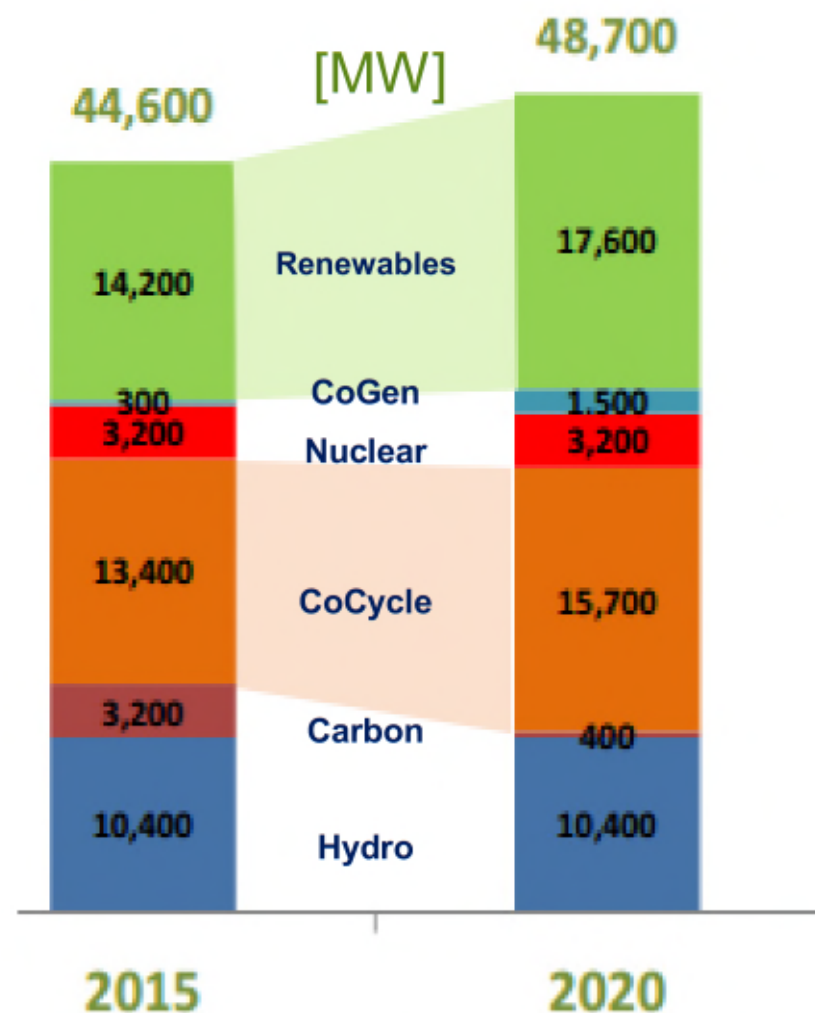


The utility of the future

Portfolio correspond to the mix aimed for in the „Energiewende“



More than 50% of the installed capacity are renewable energies and hydropower



+ 6,9 GW for clean energy
(carbon will be only 1%)

Iberdrola - An international energy leader

- Global player in energy business, huge investments in renewables energy since years
- Main markets:
 - Spain  IBERDROLA
 - UK  SCOTTISHPOWER
 - USA  AVANGRID
 - Brasil  NEOENERGIA
 - Mexico  IBERDROLA MÉXICO
- Revenue 2017: 31.2 Mrd EUR
- No. 1 wind energy producer in Europe
- Capacity renewable energy: approx. 16.6 GW; mainly onshore wind

- Over 7,5 GW Offshore-Pipeline until year 2022
- Baltic Sea – 900 MW pipeline
 - Wikinger, DE in operation since end 2017
 - Baltic Eagle, DE awarded in auction 2018
 - Wikinger Süd, DE awarded in auction 2018
 - Windanker part of auction 2021
- North Sea (UK) – 2,8 GW pipeline
 - West of Duddon Sands, UK in operation since 2015
 - East Anglia ONE, UK in construction, completion 2020
 - Saint-Brieux, F planned for 2023
 - East Anglia 2 -4, UK
- US East Coast – 4,0 GW pipeline
 - Kitty Hawk
 - Vineyard

2

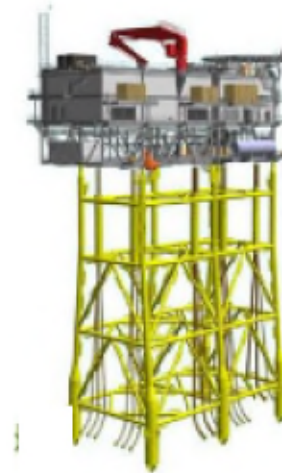
Wikinger Offshore Windfarm

- Owner and operator Iberdrola
- Investment approx. 1.4 Bil. EUR
- Project team in Berlin, London, Madrid, Saßnitz
- Baseport: Sassnitz/Mukran (Island Rügen)



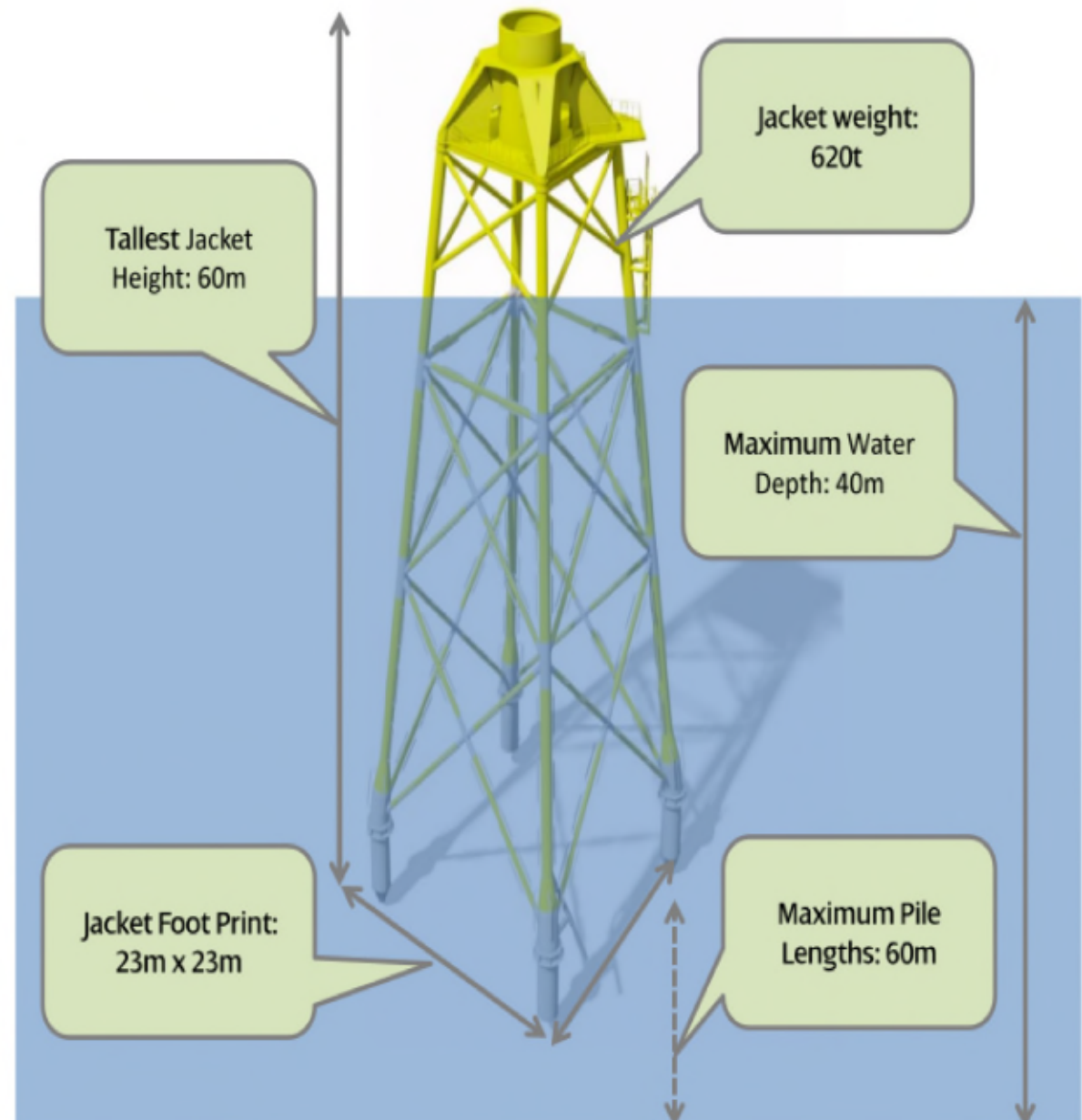
- Capacity 350 MW
- 70 Windturbines (Adwen AD5-135)
- Start Installation March 2016
- Commissioning 2017
- Handed over to operation team

- 70 Windturbines (WTG): Adwen M 5000-135
 - Nacelle (Bremerhaven)
 - Blades (Stade)
- Substation (OSS)
 - Shared with TSO (50hertz)
 - Manufacturing Navantia
 - Transport and Installation SHL
- Foundations:
 - Manufacturing (Navantia-Windar and Bladt)
 - Transport and Installation (OWFJV)
- Internal array cables Prysmian

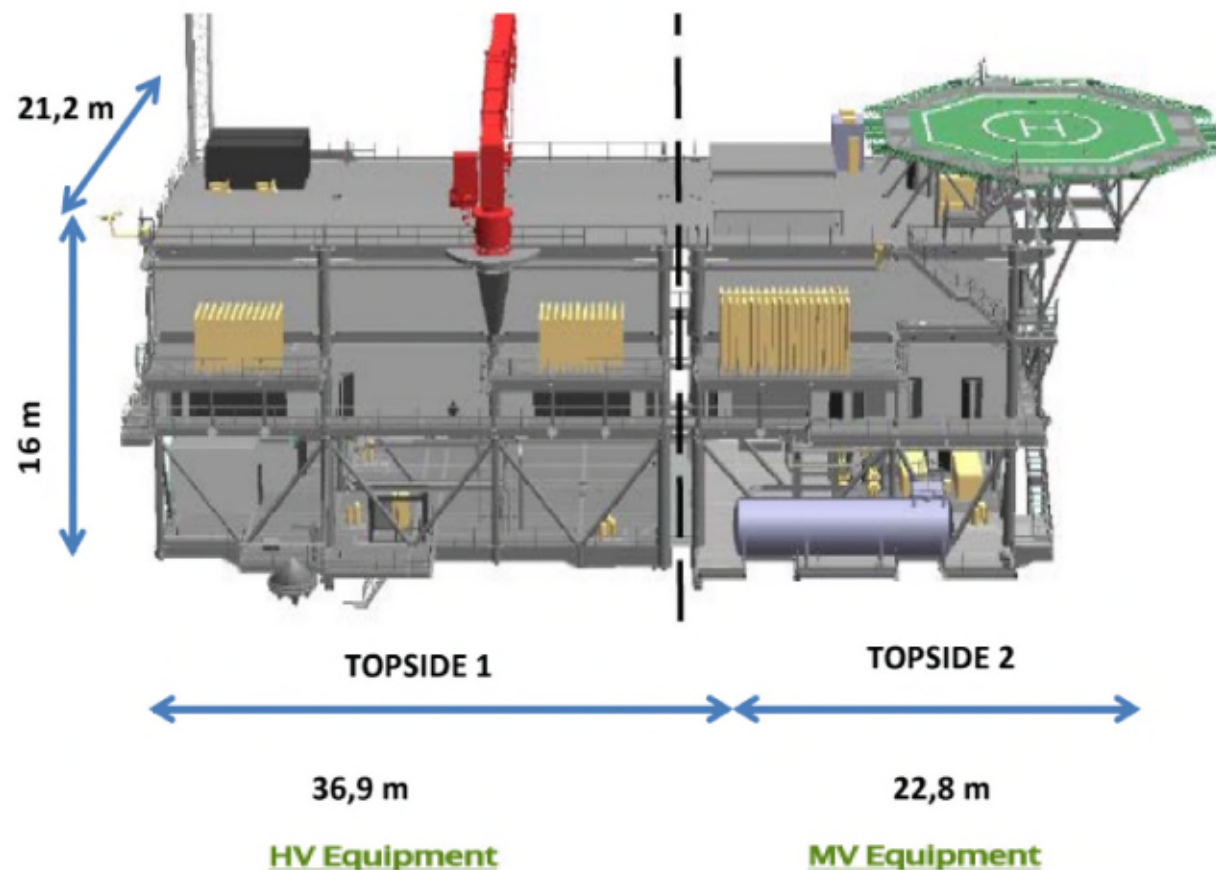




- Typ Adwen M-5000-135
- Nennleistung 5 MW
- Nabenhöhe 97,5 m
- Rotordurchmesser 135 m
- Anlagenanzahl 70



Topsides



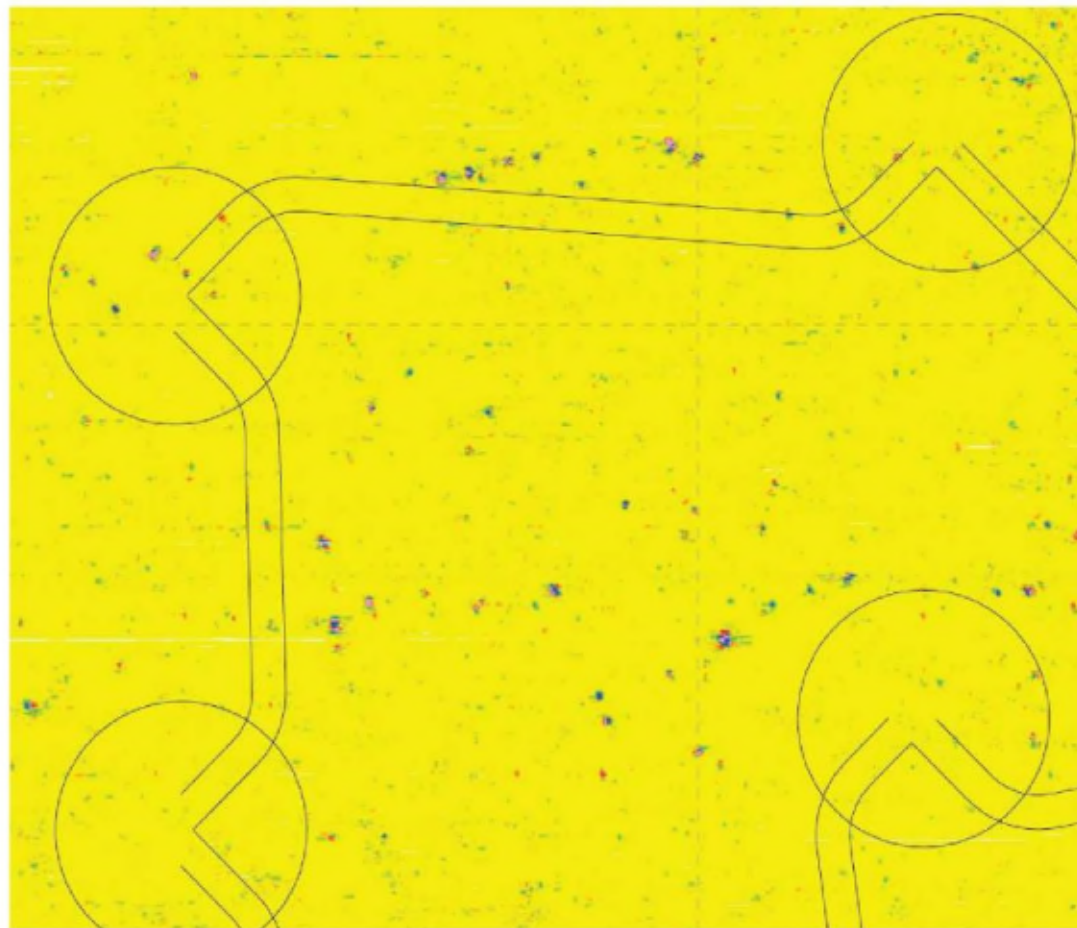
Elevations:

- Cable Deck → + 13,5 m
- Main Deck → + 20,5 m
- Utility Deck → + 25 m
- Roof Deck → + 29,5 m

Weights:

- Topside 1 → 2.646 tn
- Topside 2 → 2.202 tn

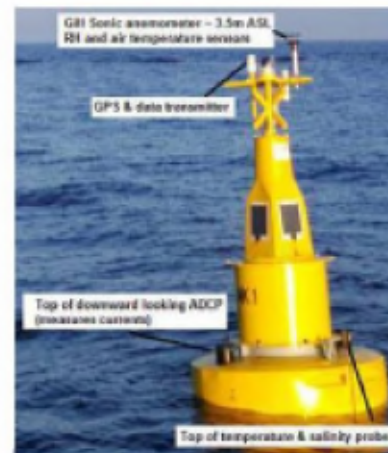
- UXO & Obstacle Investigation 2015 / 2016



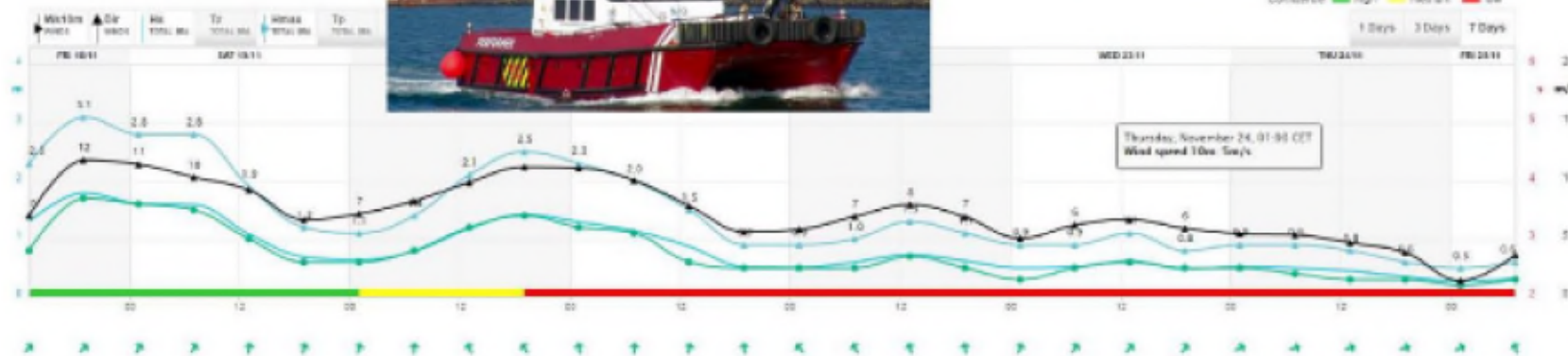
- UXO removal



- Cardinal buoy
- Weather buoy
- Weather forecasts
- Guard vessel
- Crew Transfer Vessels (CTV)
- Marine coordination



Wikinger : Forecast graphs
0000 forecast issued at 0000 CET



Baseport and
Stagging port
Saßnitz / Mukran



Installation vessel piles: Giant 7

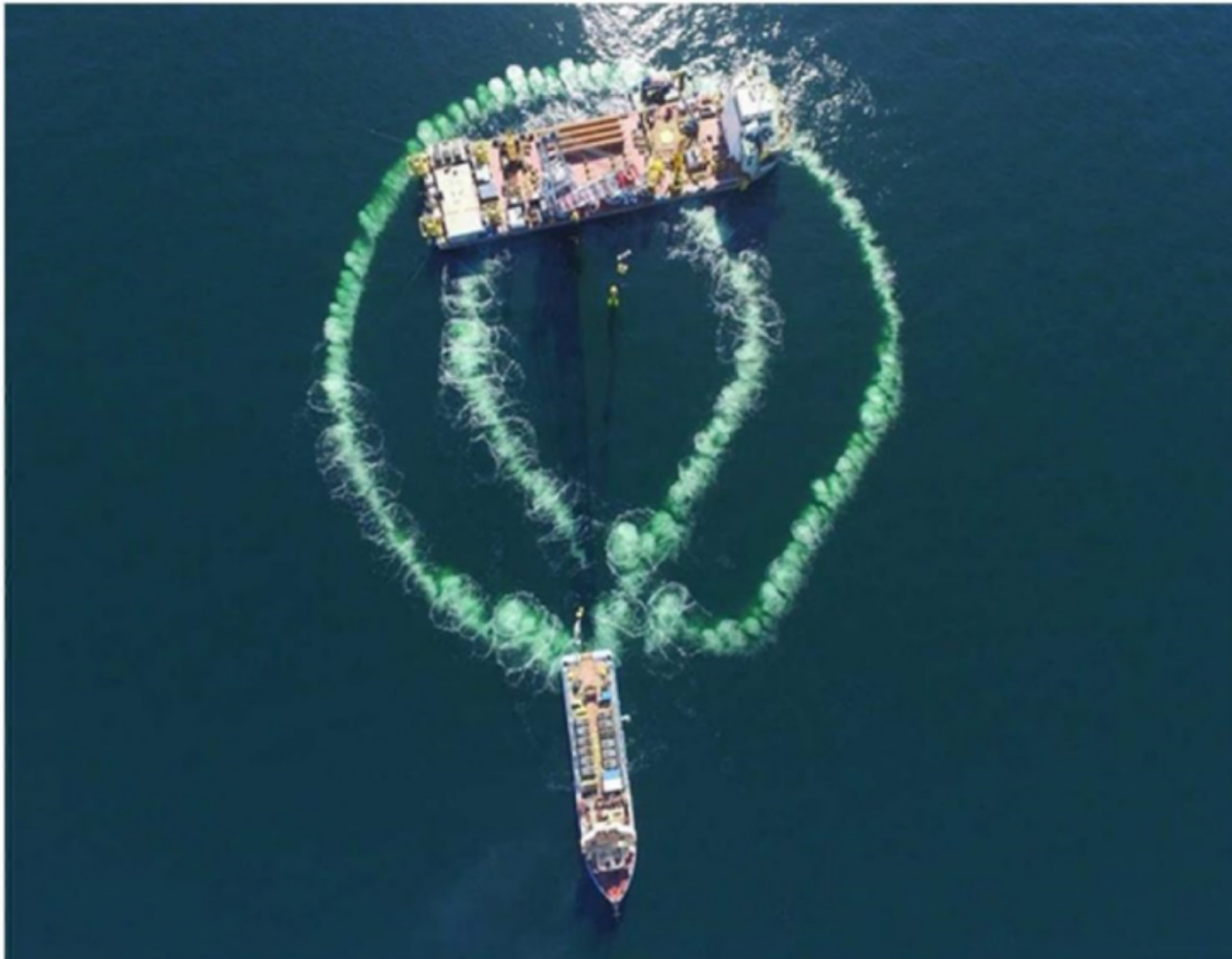




Foundation installation incl. grouting

03/2016 – 01/2017

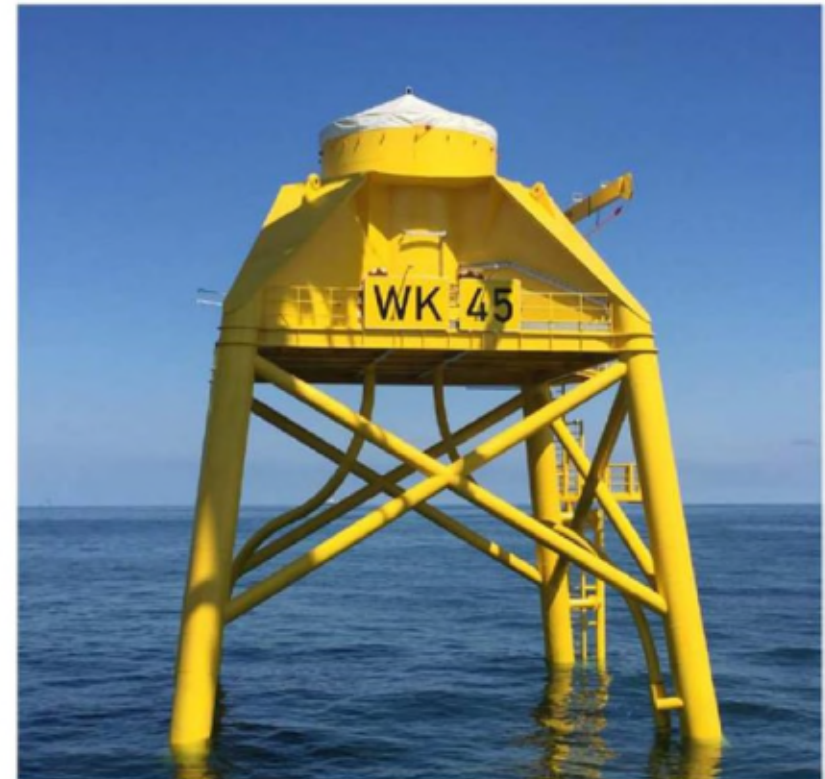














Offshore Substation (OSS):

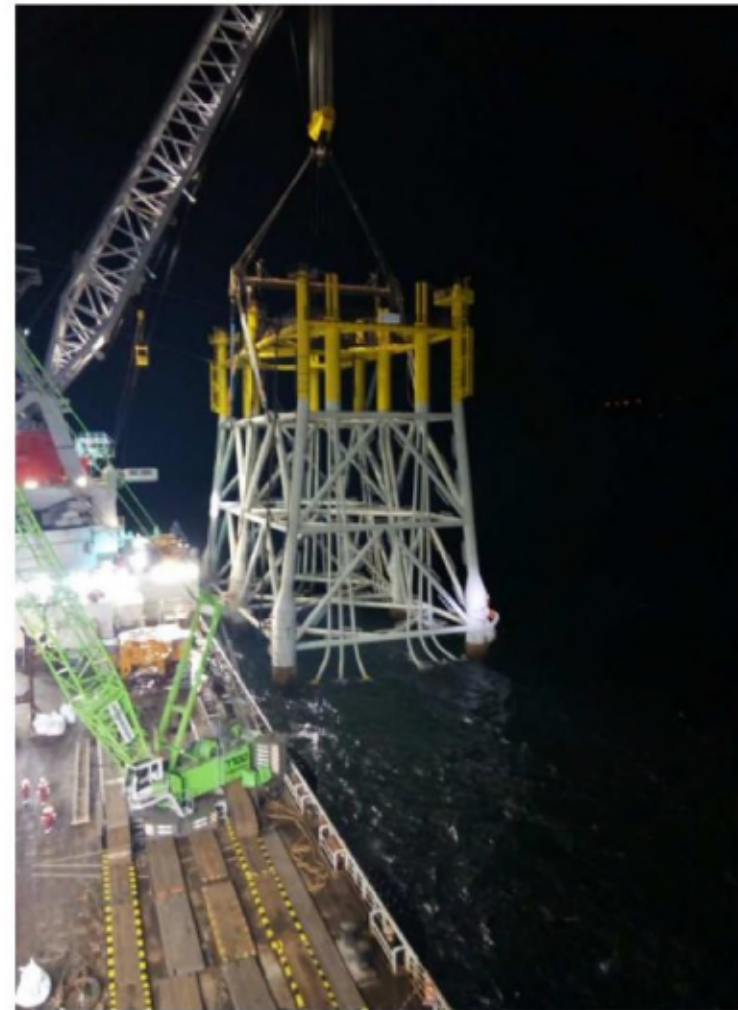
Offshore installation OSS (foundation and topside)

08/2016

















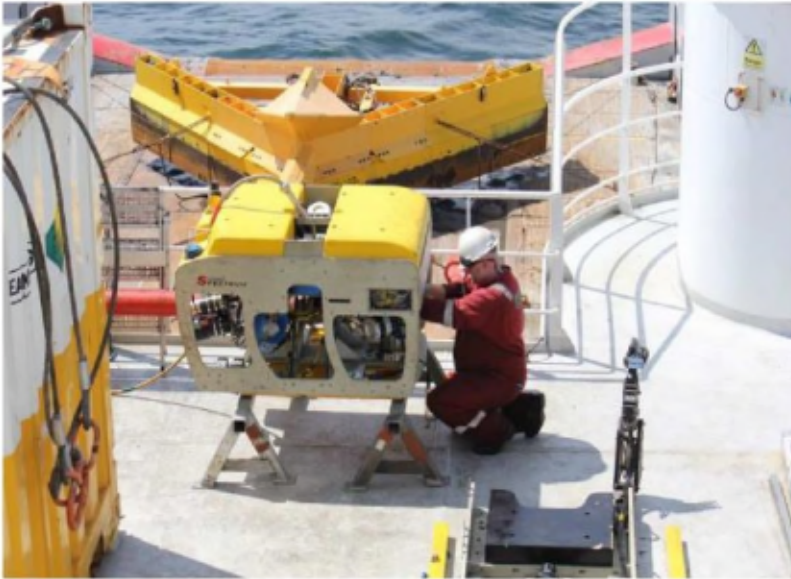


Internal cables:

Cable laying completed

01/2017





Windturbine installation:

Installation

01/2017 – 10/2017















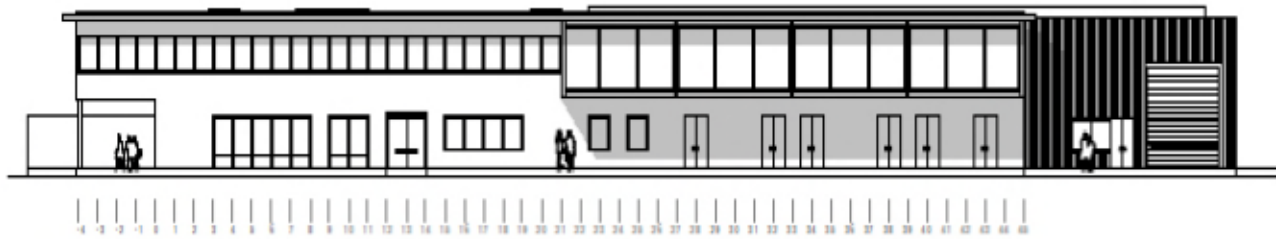








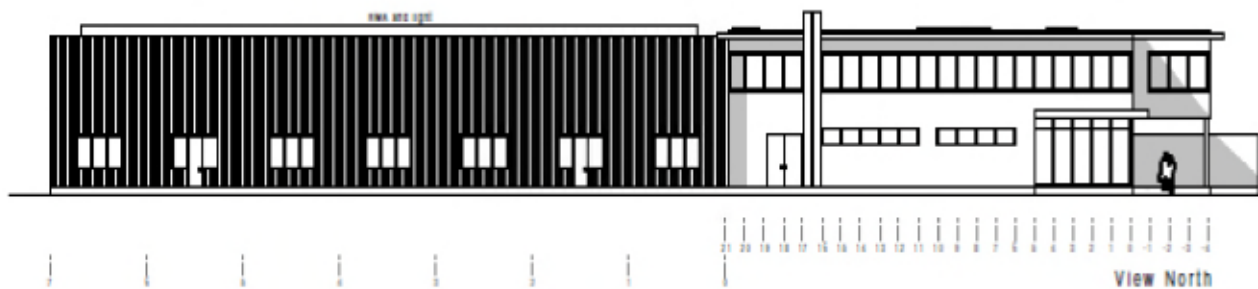




View South



View West



View North

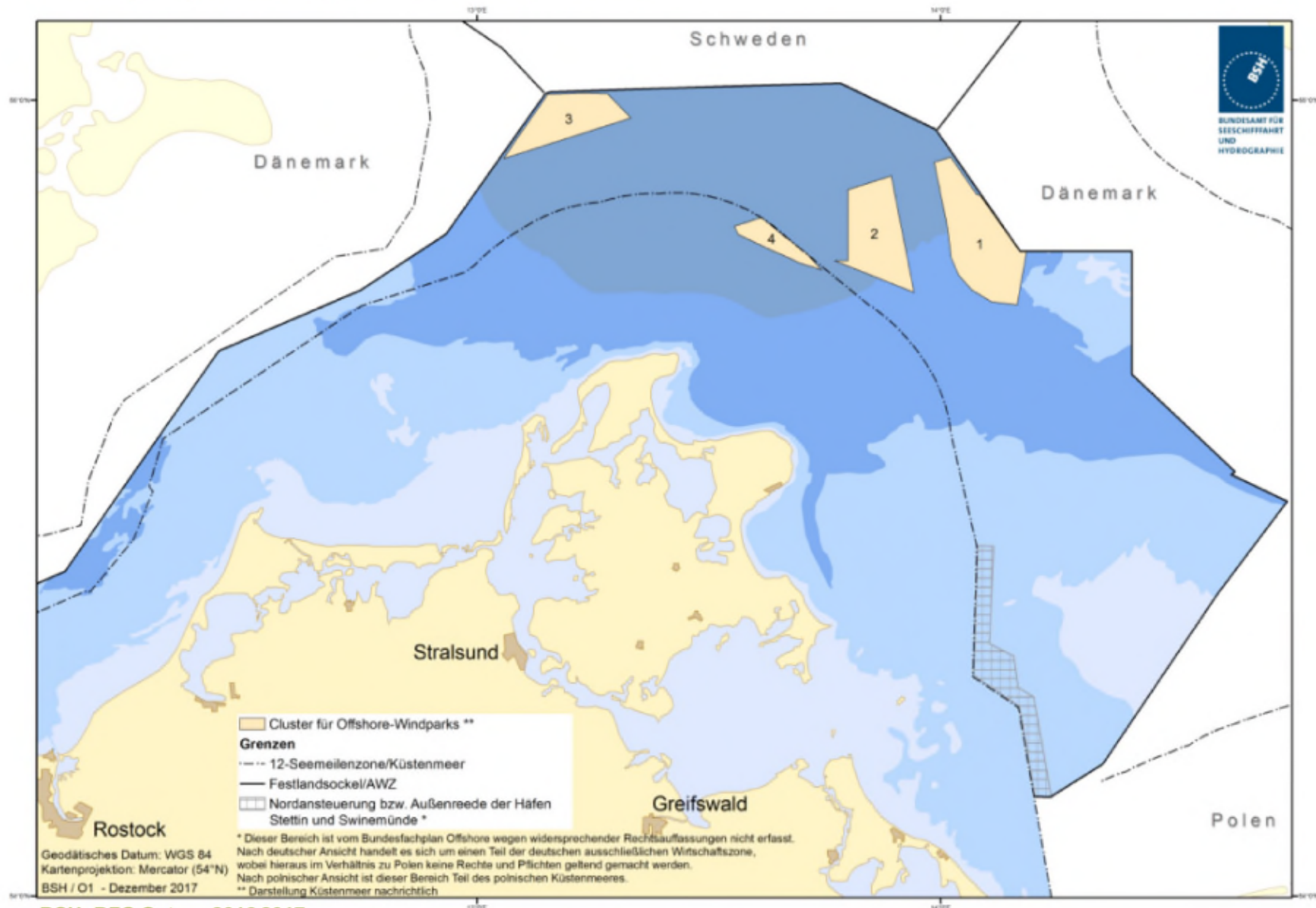




3

Iberdrola's future projects in Baltic Sea

Overview projects: German Baltic Sea



Overview projects German Baltic Sea

Area O-1 in German EEZ acc. to Pre-Draft of Area Development Plan (FEP)



BSH: FEP_Vorentwurf_2019

Iberdrola in Baltic Sea – future projects

Baltic Eagle and Wikinger Süd

- Iberdrola was awarded in 2nd interrim auction acc. to §26 WindSeeG
- Awarded capacity 486 MW
- Area approx. 35 km² + 5 km²
- Windturbine 8 – 10 MW class
- Investment approx. 1.1 Bil. EUR
- Project set-up comparable to Wikinger
- TSO 50hertz - shared platform in planning
- Grid connection scheduled acc. to BFO
- Grid connection Baltic Eagle with system OST-2-2 and OST-2-3
- Wikinger Süd will be connected to the Wikinger OSS (system OST 1-3)



Iberdrola in Baltic Sea – future projects

Windanker

- Windanker area is considered in pre-draft Area Development Plan (FEP) – O-1.3
- Iberdrola expects consideration of Windanker area in next auction
- Area size approx. 18 km²



4

Grid connection concepts

Iberdrola in Baltic Sea - Grid concepts

Possible alternatives for Grid connection in Baltic Sea

- Short-term solution in Germany:
 - Higher utilization of installed grid connection cables
 - Buffers identified within ongoing discussion of 2K-criteria
- International solution (example UK):
 - Grid connection build by windfarm operator
 - After completion handed over to TSO in a tender (OFTO)
 - Higher investment costs but project is in control of timing (coordination in one hand)

Vielen Dank

